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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/064,551      | 07/25/2002  | Gopal B. Avinash     | GEMS 0148 PU        | 1284             |

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| EXAMINER |
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AZARIAN, SEYED H

| ART UNIT | PAPER NUMBER |
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2625

DATE MAILED: 09/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                               |                                |  |
|------------------------------|-------------------------------|--------------------------------|--|
| <b>Office Action Summary</b> | Application No.<br>10/064,551 | Applicant(s)<br>AVINASH ET AL. |  |
|                              | Examiner<br>Seyed Azarian     | Art Unit<br>2625               |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 July 2002.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 10-19 is/are rejected.
- 7) ☒ Claim(s) 9 and 20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 July 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### **Claim Rejections - 35 USC § 102**

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 1-4, 7-8, 10-13 and 16-19, are rejected under 35 U.S.C. 102(e) as being anticipated by Xu et al (U.S. patent 6,363,163).

Regarding claim 1, Xu discloses a temporal processing controller adapted to receive a first image signal and a second image signal from a scanning unit comprises (column 2, lines 20-43, temporal subtraction of image and subtraction can produce and/or enhance interval changes in first and second images);

a segmentation module adapted to isolate at least one region of interest of said first image signal and said second image signal, said segmentation module further adapted to generate therefrom a segmentation signal (column 5, lines 48-54, segmentation of anatomic feature and filtering of first and second images, also column 7, lines 1-17, apply the cross-correlation technique, region of interest (ROI) image selected from the five images of the previous scanning);

a registration module adapted to receive said segmentation signal and register said at least one region of interest, said registration module further adapted to generate

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therefrom a registration signal (column 7, lines 34-52, the registration of the paired section images is performed);

and a comparison module adapted to receive said segmentation signal and said registration signal, said comparison module further adapted to generate therefrom an adaptive comparison signal of said first image signal and said second image signal (column 6, lines 27-42, the two scan are generate and compared, also column 7, lines 25-39, matching the scans (containing a number of section or slice)).

Regarding claim 2, Xu discloses the system of claim 1 wherein said scanning unit is adapted to scan an object and generate said first image signal and said second image signal from said object; and wherein the system comprises an image controller coupled to said scanning unit and adapted to receive said first image signal and said second image signal (Fig. 13, column 10, lines 8-34, CT scanner 100, storage 101, controller 104).

Regarding claim 3, Xu discloses the system of claim 1, wherein for said region of interest comprising a minor region of said object, at least one rigid body registration transformation, including at least one of translation, rotation, magnification, or shearing, is a criterion used to register said first image signal and said second image signal (column 10, lines 45-61, image registration and perform the rotation).

Regarding claim 4, Xu discloses the system of claim 1, wherein for said region of interest including a major region of said object, at least one warped transformation is a criterion used to register said first image signal and said second image signal (column

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10, lines 43-66, image matching, performs the cross-correlation, comparison and produce the warped image).

Regarding claim 7, Xu discloses the system of claim 1, wherein said first image is one of a one-dimensional, a two-dimensional image, a three-dimensional image, a one-dimensional montage image, a two-dimensional montage image, or a three-dimensional montage image (column 2, lines 36-38, three-dimensional images).

Regarding claim 8, Xu discloses the system of claim 1, wherein said comparison module is further adapted to receive a segmentation mask signal based on at least one known feature of said first image signal, said segmentation mask being generated from at least one of said segmentation module or a user input (column 5, lines 38-53, comparing the anatomic features of images and segmentation of the anatomic feature).

Regarding claim 18, Xu discloses the system of claim 17, wherein said scanning unit comprises one of a CT scanning unit, a positron emission tomography unit, an x-ray scanning unit, an MRI scanning unit, an optical imaging unit, or ultrasound (column 4, lines 55-67, CT scans).

Regarding claims 10, 12, 13 and 17, it recites similar limitation as claims 1, 3 and 4 are similarly analyzed.

Regarding claims 11, 16 and 19, it recites similar limitation as claims 7 and 8 are similarly analyzed.

**Claim Rejections - 35 USC § 103**

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 5-6 and 14-15, are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al (U.S. patent 6,363,163) in view of Song et al (U.S. patent 6,560,371).

However regarding claim 5, Xu clearly discloses a methodology for analyzing the, ROIs that selected the distribution of horizontal and vertical shifts are determined using cross-correction, and the fitted distribution is used by warping circuit to produce the subtract image (column 10, lines 57-57), but does not explicitly state “ pyramidal logic designed such that a different cost function is adapted to highlight changes between said first image signal and said second image signal”. On the other hand Song teaches the illumination changes, an example of a cost function could involve a bit-wise XOR operation on the M-ary levels in the pyramid, which can be implemented as a fast method on certain architectures. The cost function is used to determine the best match (column 9, lines 23-38).

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Xu invention according to the teaching of Song because it provides and increase the precision of the motion estimation process to

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minimize the residual signal, for accuracy, which implements in an image processing device.

Regarding claim 6, Xu discloses the system of claim 5, wherein said cost function includes at least one of mathematical correlation, sign-change measurement, or statistical analysis (column 6, lines 64-67, a curve-fitting circuit fits the distribution of the horizontal and vertical shifts using a polynomial fit).

Regarding claims 14 and 15, it recites similar limitation as claims 5 and 6, are similarly analyzed.

#### ***Allowable Subject Matter***

4. Claims 9 and 20, objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### **Other prior art cited**

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. patent (6,064,770) to Scarth et al is cited for method and apparatus for detection of events or novelties over a change of state.

U.S. patent (5,827,187) to Wang et al is cited for dynamic MR digital subtraction angiography with complex subtraction.

U.S. patent (5,873,825) to the dimensional digital subtraction magnetic resonance angiography with limited k-space mask.

U.S. patent (6,064,770) to method and apparatus for detection or novelties over a change of state.

U.S. patent (6,909,797) to Romsdahi et al is cited for density nodule detection in 3-D digital images.

**Contact Information**

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seyed Azarian whose telephone number is (571) 272-7443. The examiner can normally be reached on Monday through Thursday from 6:00 a.m. to 7:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta, can be reached at (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application information Retrieval (PAIR) system. Status information for published application may be obtained from either Private PAIR or Public PAIR.

Status information about the PAIR system, see [http:// pair-direct.uspto.gov](http://pair-direct.uspto.gov). Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Seyed Azarian  
Patent Examiner  
Group Art Unit 2625  
September 6, 2005

  
DANIEL MIRIAM  
PRIMARY EXAMINER